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INDIAN SUMMER

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MUCH of the charm which Indian Summer suggests to the mind is of a poetic nature; it is a common and at the same time a pleasing experience, with weather conditions made indefinite and mellow by imaginative processes. So large a part does the imagination play that it is difficult to find two persons agreeing as to what constitutes Indian Summer, and there is little wonder that the conclusion was reached that "this spell appears in September; that it comes in October; that it occurs in November or not at all; that it takes place in January; that it lasts for three or five days only; that it extends over a period of more than four weeks; that it is peculiar to New England; that it does not occur in New England at all; that it is now more marked than was formerly the case; that in former years it was more pronounced than now; that it has at present ceased to occur anywhere."[1]

The popular idea demands, however, two characteristics for this season, namely, a warmth above the expected or decreed temperature, and a hazy or smoky aspect of the sky, giving the landscape an impressionistic tone, and, in addition, places the time for the appearance of this phenomenon some time between the first of September and the last of December. There is nothing in the descriptions of the period which makes the condition foreign to the weather of every month of the year. It is obvious and self-evident that temperatures above the average are frequent. Haze and smoke occur in all months of the year and, possibly, are more common during the summer months. The time element is the only limiting condition, and while there is but slight agreement as to the exact time of the appearance of Indian Summer, the range of months during which it may occur is definite.

[1] The Term Indian Summer. Albert Mathews. Monthly Weather Review, v. 30. January and February, 1902. This paper is an interesting and exhaustive account of the appearance of the term Indian Summer in literature from its first recorded appearance in the year 1794.

The weather type which produces Indian Summer is not an uncommon one; it is experienced during all the months of the year. The introduction of this type to New England demands a high pressure area over the southeastern part of the United States, with a low pressure area approaching New England from the Lake region. In this arrangement of the high and low pressure areas, the wind which blows over the New England States between and part of the outblowing, clockwise movement of the high pressure area and the inblowing, counterclockwise tendency of the low pressure area is a southwesterly, and Gulf temperatures are brought by it to invade more northern lands.

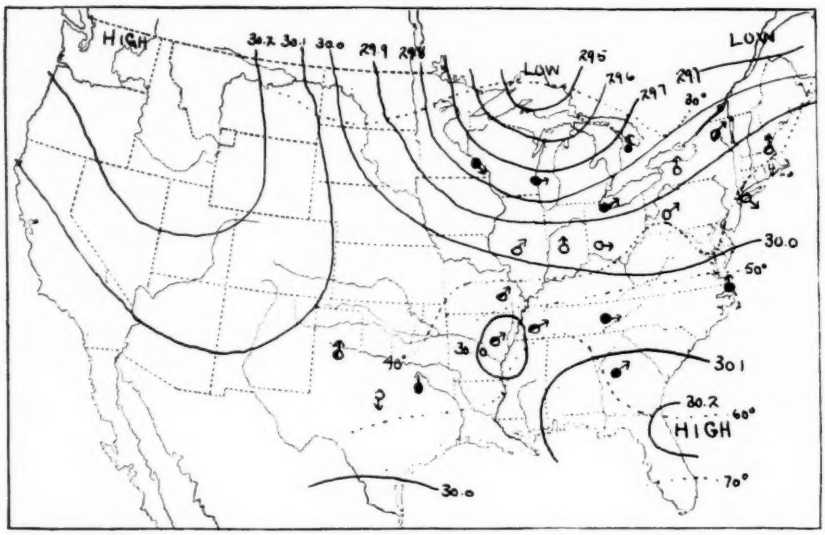

FIG. 1

I have collected a few weather types from time to time and with the expectation that a comparison of the weather map during the reign of an Indian Summer period over New England with the maps of similar conditions at other seasons of the year may be of interest, I have reproduced the weather maps published by the forecast official at Boston, Massachusetts, of every appearance of the type under discussion recorded during the school year of 1907-1908. The first arrival of this type occurred early in November—too early, according to some writers, to be called Indian Summer. The map for November 7, 1907, shows the inception of the type. The high pressure area is approaching the south Atlantic coast and a low pressure

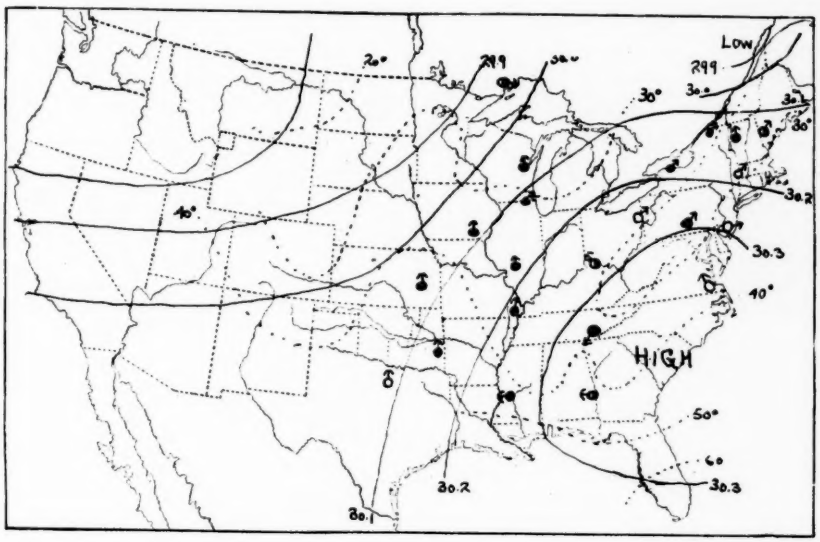

FIG. 2

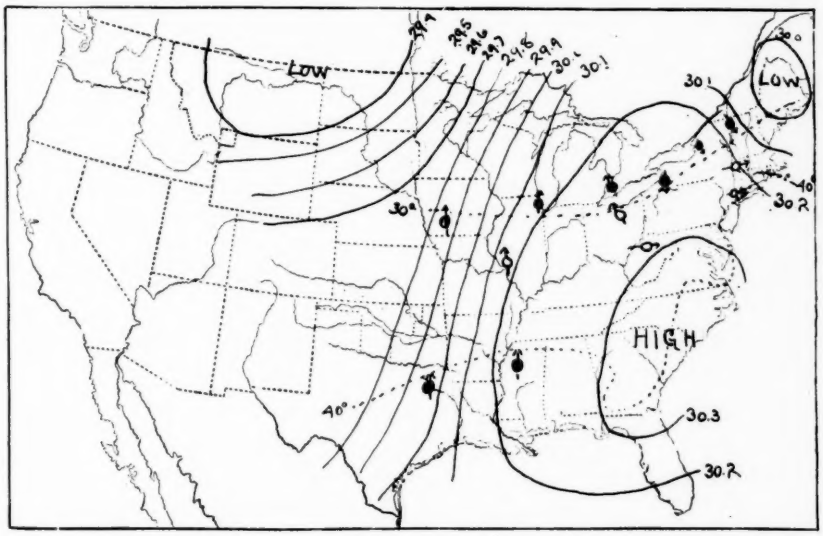

FIG. 3

area is appearing over Manitoba. With the passing of the low pressure area central over New England to the east, cooler weather in the wake of the northwest winds is the prediction. On the next day, November 8, 1907, the map shows a little change in the position of the high and low pressure areas, but there has been a shifting of the wind to the southwest. The following day, November 9, the fulfillment of the type is accomplished (Fig. I), and Indian Summer is in full sway over New England. The intrusion of the low pressure area over New England on the next day, bringing rain with it, ended the spell so far as the United States is concerned.

The next appearance of this type was on December 6-9. The map

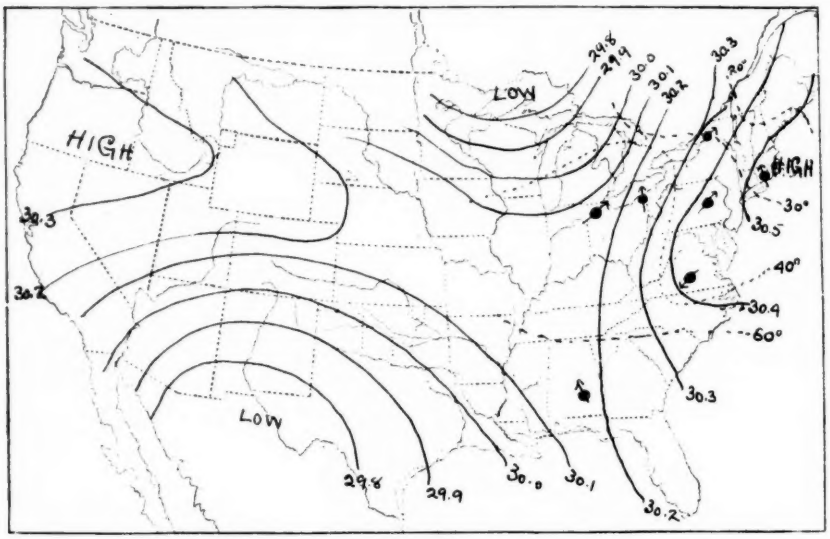

FIG. 4

(Fig. II), for December 7 is inserted. A low pressure area over the vicinity of Winnipeg, not shown on the map for this day, is a factor in the continuation of the southwest wind. At noon on December 7, the thermometer registered 50 degrees.

Fig. III is a map for December 26, 1907. A few days before Christmas the ground was covered with snow. The rain which fell during the passage of the low pressure area which is central over eastern Maine removed the snow. The Christmas day temperature was much above the average. The temperature continued rising until late on the twenty-seventh or early on the twenty-eighth. The twenty-fifth was, I suspect, a so-called "Green Christmas."

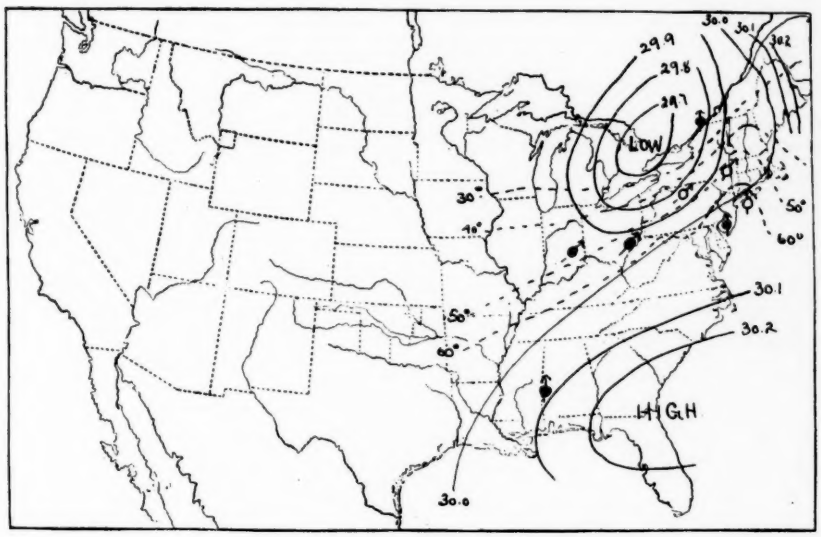
30.0
30.1
30.2
29.9
29.8
29.7
LOW
30°
40°
50°
60°
30.1
30.2
HIGH
30.0

FIG. 5

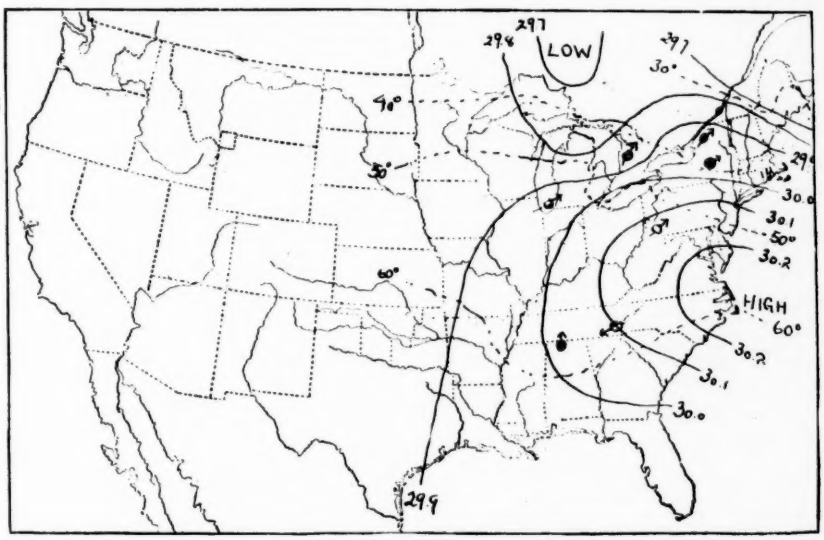
29.8
29.7
LOW
29.7
30.0
40°
50°
60°
29.8
30.0
30.1
50°
30.2
HIGH
60°
30.2
30.1
30.0
29.9

FIG. 6

On February 13, 1908 (Fig. IV.), the type appeared again; this time with considerable rain. This was the first prolonged period of warm weather of the year. The people who were looking for a "January thaw" seized upon this period of warm days and rain with the remark that the January thaw was late this year. On the day recorded by the map, the temperature was 53 degrees at noon. When this type occurs with precipitation, the atmosphere is cleared of dust particles and the hazy character of the otherwise "Indian summerish" aspect is destroyed. A few days later, the passage of the high and low pressure areas which are shown over the western part of the United States brought the reverse type to New England with a cold wave.

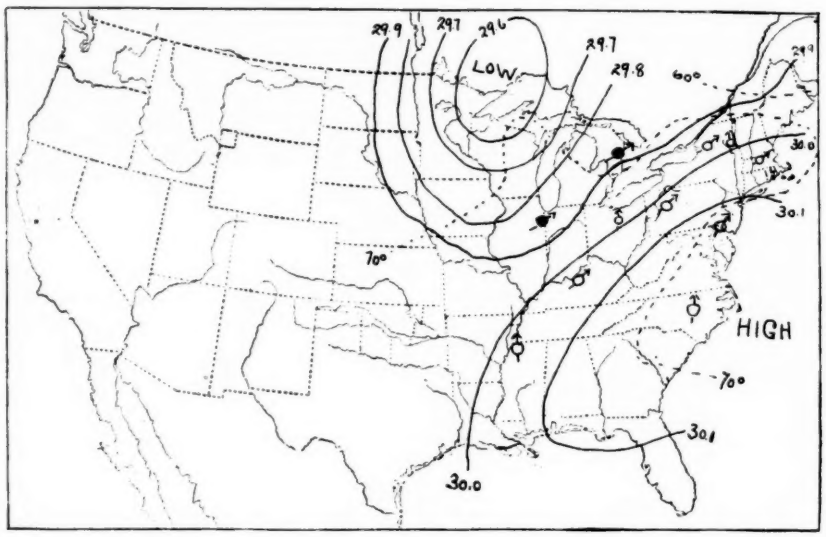

FIG. 7

On March 14 and 15, 1908, the thermometer passed the 50 degree mark and on the third day, thunder showers were experienced. This type occurring in March is often spoken of as "anticipations of May."

Two weeks later on March 28 (Fig. V.), a record day was experienced. A temperature of 71 degrees was reported in New York City and over all of the eastern part of the United States. The day was uncomfortably warm. On the following day, the low pressure area reached New England and the rain brought more seasonable temperatures.

Thoreau asks, "What is the peculiarity of Indian Summer? . . . Has

it not fine, calm, spring days answering to it?" One is led to infer that he believed it had. April 23, 1908 (Fig. VI.), was such a day. Were it not for the different aspect of vegetation on this spring day as compared with the day recorded in Fig. I., it would be difficult to differentiate the seasons. At 8 A.M. on April 23, the thermometer registered 64 degrees and during the passage of this type, thunder storms were experienced.

The last map (Fig. VII.), is for June 8, 1908. This day exceeded in temperature any previous day of the year.

While this type seems to be a common one it is possible to find long gaps between successive appearances which have any appreciable effect or which attract popular notice. So there may be years during which no prolonged period of calm, warm days occur during the autumn months. A Milwaukee, Wisconsin, observer notes[1] that during the autumn months of the last two decades of the nineteenth century there were six years (1884, '86, '87, '91, '92, '95), of marked Indian Summer; eight slight manifestations (1883, '85, '88, '89, '90, '96, '97, 1900); and six years (1881, '82, '93, '94, '98, '99), during which this phenomenon was lacking.

[1] Monthly Weather Review, 30, 440. September, 1902.

RECENT PUBLICATIONS

JUNIOR COURSE OF COMPARATIVE GEOGRAPHY. By P. H. L'Estrange; pp. 7+384. London, George Philip & Son.

The Junior Course of Comparative Geography is an abridgment and adaptation of the author's Progressive Course of Comparative Geography.

It includes the same maps in a simplified form and contains many illustrations and suggestions for practical work. It is helpful and interesting but is not adapted to the usual courses of study in American schools. As a source for supplementary individual exercises in regional geography, it is worthy of being used freely by teachers in the upper grades.

HANDBOOK OF COMMERCIAL GEOGRAPHY. By George G. Chisholm; Seventh edition. Longmans, Green & Company, 1908.

The appearance of the latest edition of Chisholm's Handbook of Commercial Geography, which has been the leading text for higher schools and colleges for twenty years, marks again the constantly increasing interest in this phase of geography teaching. The present volume is similar to its predecessors, except that it has been revised to date and a new chapter on trade routes has been added. Apart from its great worth in commercial geography, it is to be most highly commended as a reference volume which presents definitely, concisely and accurately the more important geographic features of the countries of the world.

SPECIALIZATION IN INDUSTRY BY CERTAIN CITIES, WITH PARTICULAR REFERENCE TO TRENTON, NEW JERSEY*

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GEOGRAPHICAL influences are both positive and negative, but the negative have the greater potency. For example, climate, as a geographical factor, is able to dictate absolutely where cotton shall *not* grow. Climate can not, however, with equal authority dictate where cotton shall grow. It simply says, cotton *may* grow in the Congo Basin or in Texas, but it is man who has caused cotton to grow in those places.

Geographical influences are so opposed to the establishment of silk mills in Hammerfest, Norway, that they may be said to forbid man to build silk mills there. Yet geographical influences can not dictate just where such mills shall be built. There may be a score of places whose geographical situation is favorable for such an industry. But the exact influence which finally leads a man to build his mill here or there, and thus, perhaps, unsuspectingly to start a Lyons or a Paterson, may be quite outside of the field of geography. That influence may be the attitude of a board of trade in a given city; it may be that some man of capital and enterprise happens to live there. It may be almost if not quite accidental. For example, two small cities in Fulton County, New York, namely, Johnstown and Gloversville, make half of the leather gloves and mittens made in the United States. Is there anything in the location of natural resources of this county to account for this? Apparently nothing. The towns are two hundred miles from New York City, and not near any leather market, and not well situated with regard to selling markets. They are not even on a main line of railroad, have no advantage of water transportation, or easy access to fuel. The manufacturers themselves are not aware of anything especially favorable in the location of the places, as one of them says in a personal letter. How, then, can we account for the concentration of the glove and mitten industry in Fulton County, New York? So far as I am able to discover, the explanation lies in the fact that as far back as 1760, Sir William Johnson brought a few skilled glove makers from Scotland, and set them at work on his estate in the foothills of the Adirondacks. Thus, the industry got its start in this region, grew, attracted more workmen, and with the momentum of an early start, expanded with the expansion of the country.

*Read before the Association of American Geographers, Baltimore, Jan. 1, 1909.

Another illustration is seen in the case of Troy, New York. This one city manufactures 85 per cent. of the collars and cuffs made in the United States. Troy seems to have no advantage of location for such an industry over scores of other cities. The only explanation that I find for this remarkable case of centralization of an industry, is that a blacksmith's wife, living in Troy, was the first known person to make detached collars; that a Methodist minister believed they were practical, and, some seventy-five years ago, began the manufacture of detached collars and cuffs in his home town. This explanation may or may not be true.

Purely geographical influences may dictate where collar and cuff factories might *not* be successfully operated, as, for example, in Montana or Arizona. Geographical influences may set pretty definite boundaries to the region within which a certain manufacturing industry may be expected to thrive; but, other than purely geographical factors influence men in the selection of the exact place where they will locate manufacturing plants.

A special census bulletin is devoted to instances of cities or sections in which specialization in some industry is carried to a noteworthy extent. Of some twenty conspicuous examples taken from this bulletin, only three cities seem to offer sufficiently unique advantages of situation to adequately account for their specialization in the industry named. Birmingham and Pittsburg are uniquely situated for the manufacture of iron and steel, though the selection of Gary by the United States Steel Corporation as the site for its mammoth new steel plants seems to cast some present doubt upon even Pittsburg.

The water power available at Minneapolis, Paterson, Fall River, Cohoes, and Holyoke, explain clearly enough why manufacturing cities have grown up on these sites, and there are definite geographical reasons why Minneapolis should make flour instead of silk, and why Paterson should make silk instead of flour. Yet, it might be incidentally noted that a city very near to Paterson, namely New York, is the second flour-making city in the union. There appears to be no good reason why the water power of the Mohawk should not have suggested the establishment of silk or woolen mills as well as knitting mills. So far as geographical advantages are concerned, it is not easy to see why Providence might not, to equal advantage, make felt hats, and Danbury make jewelry; or why Brockton might not have made stockings, and Cohoes have made shoes. Geographical causes do not fully explain why South Omaha is almost wholly given up to slaughtering and meat packing. On the other hand there are perfectly definite geographical reasons why the meat packing cities should be in the

Middle West, and why the making of jewelry, silk, carpets, collars, hats, and shoes should, at present at least, center in the East.

While the *growth* of a city is usually due to pretty definite causes, causes that you can put your finger upon and say, "Here they are," yet the *kind* of manufacturing which a given city may especially develop is often due not so much to geographical influences as to causes quite outside of the field of geography. The formation of the International Harvester Company was probably the immediate cause of centering the manufacture of farming implements in Chicago. In 1880, Springfield, Ohio, manufactured twice as much farming machinery as did Chicago. Yet it is altogether probable that the Harvester Company chose to concentrate its plants in Chicago for definite geographical reasons. It was not a change of geographical conditions from favorable to unfavorable that ruined the extensive salt-making industry of the Wyoming Valley in western New York; it was the formation of the National Salt Company. The one plant in the Valley that refused to enter the trust, and has continued to make salt in the territory abandoned by the trust has prospered wonderfully, while the National Salt Company went into bankruptcy. Bad business management may ruin an industry, even though all geographical conditions are favorable. Good business management may make an industry thrive even in a semi-favorable situation, as, for example, the glove and mitten industry of Fulton County, New York. It may be contended that eventually, good business management will lead the manufacturers to remove to some locality where geographical conditions are ideal, as seems to be the case of the Steel Corporation in building at Gary, and of the Harvester Company in concentrating in Chicago. Such a contention can not be denied.

The development of cotton mills in New England may be explained in part, at least, on geographical grounds, but the present movement of the industry to the South is believed to be as much due to the ability to secure cheaper labor, and the greater freedom from the domination of labor unions, as it is to get nearer the supply of raw material or to get the water power of the Piedmont.

Passing now to the second division of my paper, I shall consider the geographical and other influences which materially affect the pottery industry of Trenton, New Jersey.* This is one of the cities in which specialization in manufacturing has gone to a notable extent. Practically all of the text-books which mention the concentration of clay working in Trenton state that it is due to the supply of local clay. (One author says: "The centering of the pottery industry in Trenton is the result of an early

*The writer lived at Trenton, N. J. at the time of writing this paper.

start due originally to local deposits of clay suitable for the purpose." Another says: "Trenton is situated close to abundant supplies of pottery clay and is the most important pottery-making city in the Union." A third says: "In and near Trenton, New Jersey, there is a kind of clay which may be manufactured into pottery of a very high grade.")

Now, it is the most natural thing in the world that a writer should readily believe that the extensive pottery industry of Trenton is due to a local supply of suitable clay. Such a belief has long prevailed, and has passed for a fact. It would seem that this ought to be a fact, but it isn't.

There are some thirty potteries in Trenton, employing 5,000 wage earners, and producing ware valued at $6,000,000 annually. It is the leading pottery center in the United States, closely followed by East Liverpool, a small city in southeastern Ohio. (One half of the pottery output of Trenton is sanitary ware; the table ware produced is largely of the medium and cheaper grades. Two or three potteries make very expensive and very artistic ware; for example, dinner plates at $300 a dozen.)

There are clay deposits around Trenton, and the first rude plant a century ago made a little crude colored ware of this clay. This was also done in various places in the Eastern States. Burlington, New Jersey, made pretty good ware as early as 1688. Philadelphia made pottery a hundred years before the industry had any real beginning in Trenton. which was in 1852. Trenton's only real rival, East Liverpool, began its pottery-making career thirteen years ahead of Trenton. Trenton, then, has not the advantage of the earlier start nor the advantage of local clay deposits of a superior quality.

It is generally agreed among the older potters that the high premium on gold during the Civil War was the one great cause that enabled the industry to get a healthy start. Foreign pottery had to be paid for in gold, which was at a premium of about 200. This so increased the price of pottery that American manufacturers could make it at a good profit. A tariff duty of 55 per cent. now protects the industry. The wages paid to potters here is over 100 per cent. higher than are paid in England.

In determining whether or not a place is favorably situated for carrying on a particular industry, the following factors must be considered: 1. The nearness of raw materials; nearness not being measured in miles but in cost of transportation. 2. Nearness to markets, and transportation facilities. 3. Cost of fuel or of power. 4. Labor conditions. There are other factors, but these are the leading ones.

With regard to the first-named factor, nearness to a supply of suitable

raw materials, what is true of Trenton? The three most important materials are clay, feldspar, and flint or quartz. The clay is, of course, the chief one. The only clay found near Trenton is a coarse, dark-colored material that is used only for making saggers or for other crude purposes. The saggers are the receptacles in which the pottery is placed for firing. This local clay is somewhat better than common brick clay, but is wholly unfitted for making white ware. It is, however, necessary in the business, and its cheapness is a factor. But the pits that supply this coarse sagger clay are four miles from Trenton, and the clay is hauled this four miles in wagons at a cost of one dollar a ton. Now, one dollar a ton is the ocean freight rate on English clay from Cornwall to New York (it is also the railway freight rate on clay from Delaware or from Raritan Bay region, where New Jersey's best clay deposits are found—some of Trenton's potteries do not use local clay even for saggers). The clay that actually enters into the pottery comes from the South, the best from Florida, or it is imported from England. The Trenton potteries use for pottery about the same amount of imported clay as they do of American clay. The feldspar comes from Maryland, Pennsylvania, Maine, and Canada. Flint is obtained in various places, but mostly outside the state. The best is imported from France. It is quite evident, then, that in the securing of the raw materials, other eastern cities have, at least, an equal advantage. There is nothing unique in the situation of Trenton.

(2) Nearness to markets and transportation facilities:

Trenton has good railway facilities, river connection with Philadelphia, canal and river connection with New York. Thus stated, the impression is given that Trenton manufactures may avail themselves of cheap water rates to the great markets near by. Here is an illustration of the difference between geographical advantages left to be freely utilized by man, and such advantages under the purposeful control of an interested corporation. The Pennsylvania Railroad controls the canal and thereby so largely controls the rates of transportation on the river that the Trenton potters make but little use of waterways to the great markets of New York and Philadelphia. It is quite possible, however, that the waterways may have been of larger advantage once than they now are. It is probably true that the chief geographical advantage enjoyed by Trenton is its central location in a populous region, and yet several other cities are equally well located; Camden and Jersey City have the added advantage of being seaports.

(3) Cost of fuel:

Fuel is the most expensive item in the pottery business, with the single

exception of labor. Fuel costs at least fifty per cent. more than the raw materials of manufacture. Soft coal from southwestern Pennsylvania is generally used, though anthracite coal is also used. The soft coal now costs $1.60 a ton and the freight is $1.90 a ton. Inasmuch as more than half of the cost of the materials used by the potteries is due to freight charges, the freight on coal being the largest item, it would appear that the ideal location for a pottery-making center would be near the soft coal mines. In this respect East Liverpool has an advantage. That city also has natural gas. Therefore, in the ability to get cheap fuel there is nothing unique in the location of Trenton.

(4) Labor conditions:

This is not a geographical matter, but it is really the most important of all the factors which tend to make or mar the success of the pottery industry. In the pottery centers, the labor unions dictate wages and most of the rules under which the men work. Thus far the manufacturers have found it better economy to submit, inasmuch as their competitors are generally subject to the same conditions. I think any manufacturing potter in Trenton will tell you that geographical location, cost of materials and fuel, are all minor considerations when compared with the question of labor. Eighty-five or ninety per cent. of the cost of finished pottery is the cost of labor. Little machinery is used and the raw materials are relatively inexpensive. It is figured that a ton of Florida clay in the pit is worth from 25 to 50 cents. The freight to Trenton is $5.00 a ton, and this clay, laid down at the Trenton potteries costs $10.00 a ton. A ton of finished pottery is worth from two or three hundred dollars, to a sum reaching far into the thousands, and almost all of this increase in value from the twenty-five cent clay in the pit, is paid for labor. The pottery owners with whom I talked expressed the opinion that under present labor conditions it is a disadvantage to be located in a pottery center, where labor union dictation is naturally strongest.

Summarizing, it seems to me that the building up of a pottery center in Trenton is due, first, to the fact that clay is widely distributed in New Jersey. The making of coarser clay products in various parts of the state is a natural geographical response. From the making of the coarser ware out of local clay to the making of better ware out of imported clay is an easy and natural step. In 1852, a pottery was built in Trenton as others had been built elsewhere. The local supply of sagger clay, the central location of the city, and doubtless, the transportation facilities, were regarded as favorable conditions. This early pottery-making venture was

reasonably successful. Many potteries in Trenton have been unsuccessful. Had the first ones been such, perhaps Trenton would not have become a clay-working center. The notable expansion of collar and cuff factories in Troy, of knitting mills in the Mohawk Valley, and of silk mills in Paterson, has, in all probability, a psychological as well as a geographical explanation, namely, the power of suggestion. Local men more willingly embark in an industry of which they know something at first hand, and in which experienced workers and superintendents are at hand, than in an enterprise of which they know little or nothing.

Permit me then to return to my earlier thesis, that geographical conditions may dictate where a manufacturing industry can not succeed; geographical conditions may fix the boundaries of the region within which a manufacturing industry may be expected to succeed; geographical conditions may suggest the exact place where a certain industry may advantageously locate. Yet a study of the cities in the United States which specialize in certain lines of manufacture, and a study of the particular case of Trenton, New Jersey, lead me to the belief that the concentration of industries in certain places is not even generally traceable to purely geographical conditions, but that the influences which bring about the concentration are complex, and that one is seldom safe in assuming, without considerable knowledge of the particular case, that the concentration is due to some unique geographical advantage possessed by that place. Geographical influences are always present and always operative, but they work in conjunction with many other influences that can be known only by an examination of the particular case in question.

THE PRACTICAL GEOGRAPHY.—Part 1. By J. F. Unstead; pp. 120. Oxford, The Clarenden Press, 1908.

Unstead's *Practical Geography* is a small volume containing 412 exercises for beginners in geography, these exercises being grouped under the following headings: Maps and Plans, The Home District, The Weather, The British Isles. The exercises vary in difficulty most strikingly. Some are adapted to a nine year old, and some would be found fairly severe by a good secondary school student. The exercises under the first three topics would be suggestive to many teachers in America but on the whole the book is planned for British use and would be most serviceable there because many of the exercises are based on British maps and statistics. The book is interesting to us as showing possibilties that have been much neglected in this country.

R. E. D.

GEOGRAPHY AT THE UNIVERSITY OF WISCONSIN

By LAWRENCE MARTIN
Assistant Professor of Geology, University of Wisconsin

THE courses in geography at the University of Wisconsin are chiefly given in the Department of Geology of the College of Letters and Science, although allied courses are offered in the Departments of Meteorology, Political Economy, Political Science, History, and in the Colleges of Engineering and Agriculture.

PHYSICAL GEOGRAPHY.—*Physiography,* or Physical Geography (the first semester of Geology 4) may be taken as a five-hour course, with lectures, recitations and two two-hour periods of laboratory and field work, or as a three-hour course (Geology 3), without the laboratory and field work. In each course there is also one all-day excursion (Saturday) during the fall field season. This is the basal elementary course. It deals with the lands, the atmosphere, and the oceans, proper consideration being given to the earth as a planet, to rocks, structures, processes, agencies, forms, etc. (much illustrative material being taken from the several physiographic provinces of the United States), and all in their relationships to life. A third elementary course in *Physical Geography* (Geology 4a) is given for freshmen in the Commerce Course who are required to take physiography in preparation for economic geography. This latter course is more along the line of applied physiography than the pure science, because the commerce students do not usually take the courses in regional geography which follow the elective course in physiography. Geology 3 and 4 are offered by the writer, Geology 4a by R. H. Whitbeck.

Advanced Physiography (Geology 9), offered by the writer, involves both the topical and the regional study of processes and features of the earth's surface, attention being given in successive years to specialized topics such as rivers, weathering, wind, glaciers, the ocean, shore lines, volcanoes, earthquakes, mountains, etc.

METEOROLOGY.—The courses dealing with the atmosphere are given by the local forecaster of the United States Weather Bureau. The introductory course (*Meteorology 1*) consists of two lectures and one practice period a week, and deals with the stormy phenomena of the atmosphere, giving especial attention to the explanation of the movements of the air and of the transformations of the moisture of the air in terms of the laws of physics, together with practical work in measuring the barometric pressure, tempera-

ture, rainfall, wind, humidity, and evaporation with standard instruments. In the course the work of the United States Weather Bureau is explained, and its results applied to problems arising in the work of the farmer, enginneer, and teacher.

One semester of meteorology is followed by a semester of *climatology* (Meteorology 2) consisting of lectures on the methods and materials of climatology, followed by a study of the climates of the world and of special regions with references to their physical causes, and exercises in the discussion of climatic data.

Agricultural Climatology (Soils 25, in the College of Agriculture) is a two-hour course for one semester including a brief introduction to general meteorology followed by the study in detail of the relation of climate to soil fertility and to crops.

Advanced Work and Research in Meteorology (Meteorology 3 and 4) includes a study of the applications of the laws of hydrodynamics and thermodynamics to atmospheric phenomena, following the work of recent investigators. Meteorology 1-4 are offered by E. R. Miller, and Soils 25 by A. R. Whitson.

Economic Geography.—Economic or Commercial Geography is dealt with in two courses, *The Economic Geography of the United States* (Political Economy 7b), including a brief survey of the development of industry and the expansion of commerce, with a special study of the production and distribution of the principal articles which enter into American commerce, while *Economic Geography* (Political Economy 7a) gives a general survey of the present status of industry and commerce in the principal countries of the world excepting the United States. These are three-hour courses of a semester each, planned especially for students in the Commerce Course. They are offered by H. C. Taylor, who also conducts advanced courses along similar lines, and in connection with his work for the United States Census.

Regional Geography.—The courses in regional geography are an application of the principles of systematic physiography and geography to the areal description of a region and the geology, topography, physiographic, history, climate, and natural resources of the several parts, the influence of geographic conditions on manner of life, industries, location of cities, and historic events. The regions described in successive courses are (a) the world, (b) a continent, (c) a single state. The regions of the world are studied briefly in *Geography,* a five-hour course (the second semester of Geology 4), with lectures, recitations, and laboratory work, or in an iden-

tical course (the second semester of Geology 3), without laboratory work. A second year's course in regional geography, a three-hour course, deals with a smaller unit in a more detailed manner, *The Geography of North America* and, in alternate years, *The Geography of Europe* (the first semester of Geology 5). This is followed by another three hour course on the regional geography of a still smaller unit, *the Geography of Wisconsin* (the second semester of Geology 5). Geology 4 and 5 are offered by the writer.

TEACHERS' COURSES.—Work for teachers is at present limited to a course on *The Teaching of Physical Geography* (Geology 10), which includes both subject matter and methods and considers the aims in teaching physical geography in the high school, the phases of the subject which deserve emphasis, the relation of the subject to others in the curriculum, materials for the teacher's use, and field and laboratory work. This is a three-hour course for one semester, offered by R. H. Whitbeck. Physical Geography by correspondence is offered by the writer and is available for teachers and others unable to come to the university during the college year. Other courses for teachers are offered during the summer session and many lectures on geography and travel are given through the University Extension Division.

COURSES ALLIED TO GEOGRAPHY.—Of the courses allied to geography mention may be briefly made of Professor F. J. Turner's *History of the West,* in two three-hour courses of a semester each (History 11a and 11b), in which particular attention is paid to the conditions of westward migration; and to the economic, political, and social aspects of the occupation of the various physiographic provinces of the United States, Professor A. L. P. Dennis's *British Empire Europe and Asia, Europe and America* (History 43, 48, 49) and Prof. P. S. Reinsch's *Contemporary International Politics* (Political Science 19), are strongly geographic. Lecturer C. H. Hawes' courses in *Anthropology* (Political Economy 6, 19, 47, and 48), are allied to geography, as are Professor D. W. Mead's *Hydrology* (Hydraulic Engineering 10), Professor A. R. Whitson's *Soils* (Soils 1 and 30 in the Agricultural College), President C. R. Van Hise's course on *The Conservation of Natural Resources,* and many others. Mention has not been made of several other courses in geology which are partly, at least, geographic or of *Topographic Drawing and Mapping* (Topographic and Geodetic Engineering 1) and *Rapid Topography* (Topographic and Geodetic Engineering 9), and similar courses.

MUSEUMS, SPECIAL LECTURES, ETC.—Geographical materials are

fairly well represented in the laboratories and museums of the University, notably in the Geological Museum where many maps, photographs, and models are available, and where four large topographic models have been manufactured during the past year. Special geographical exhibitions are made at times and special lectures are given by visiting geographers every year.

FIELD WORK AND RESEARCH.—Several of the instructors in the Geological Department of the University of Wisconsin are engaged in research and exploration during the summer vacations in connection with the United States Geological Survey, the Wisconsin Geological Survey, several commercial enterprises, and expeditions sent by geographical societies. A few advanced students are taken as assistants to the various regions studied. During the summer of 1909, for example, students were thus employed in field parties working in the Lake Superior Region, in Wisconsin, Michigan, and Minnesota, as well as in Utah, in Montana, near Hudson Bay, and in Alaska. Geographical research and *theses* are based upon such field experience and upon laboratory investigations, or upon statistical work in the libraries, etc.

A simplified outline of the geography courses at the University of Wisconsin follows, only those in physiography, meteorology, economic geography, regional geography, and the geography for teachers being listed.

GEOLOGY 3 OR 4 Physiography	METEOROLOGY 2 General Climatology and Climate of the United States	POLITICAL ECONOMY 7A Economic Geography (of the world except United States)
GEOLOGY 3 OR 4 Geography (of world)	GEOLOGY 4A (Commerce) Physical Geography	POLITICAL ECONOMY 7B Economic Geography of the United States
METEOROLOGY 1 General Meteorology		

GEOLOGY 5
Geography of North America or Geography of Europe

GEOLOGY 5
Geography of Wisconsin

GEOLOGY 9 Advanced Physiography	METEOROLOGY 3 Advanced Work in Meteorology	GEOLOGY 10 The Teaching of Physical Geography

GEOLOGY 22
Research Work and Thesis

NOTES

THE ANTHROPOGRAPHY OF NEW YORK.—New York, of course, has anthropographic interest for us in greater degree than other cities. The absoluteness with which the Island of Manhattan is limited geographically has caused a phenomenal condensation here. If the tunnels recently opened west and east are to destroy this limitation, material redistribution of people can hardly come in time to show before the census of 1920. Two new shadings for density have now to be introduced, one for 150,000 to the square mile, which we shall see used again in Europe, and the deepest of all, which appears in Manhattan only, that for 300,000. Here, again, the state as well as the political city is bounded by the Hudson. Where only the East River bounded the city, it has grown across into Brooklyn as also into Staten Island (Richmond Borough), across the Hudson, where the state boundary also swerves away from that river to the westward. It is certain that only the state boundary prevents the inclusion of Hoboken and Jersey City. Anthropographically and, indeed, commercially they are a part of the city to-day. On four successive voyages out of New York the writer has sailed from Brooklyn, Jersey City, New York proper and Hoboken. Bayonne is not a part of it, for the diagram shows plain suburbs between it and Jersey City, so that it is not continuous with the urban population. Newark might seem to be in some doubt. It is here included on the ground that there is only water and tidal flats between it and the rest of the city, and water must be recognized to connect rather than separate. Readers will hardly need reminding that most of the Jersey shore opposite Manhattan Island is occupied by the steep bluffs of the Palisades. The figure displays all this as well as the enormous open spaces of Queens, Brooklyn and Richmond Boroughs. It is not at all probable that the parts of Queens that march with Brooklyn are purely suburban as here represented, but the data of nine years ago are regarded as so ancient in all great American cities that the ascertaining of the ward boundaries of 1900 has been the work of much labor and especially so in New York. In Queens they could not be ascertained. The five wards have densities of 7,000, 1,800, 800, 500, and 1,200 respectively. Twenty thousand, about half the population of the densest one, have been added as urban. The results of the discussion of details give us for New York in 1900:

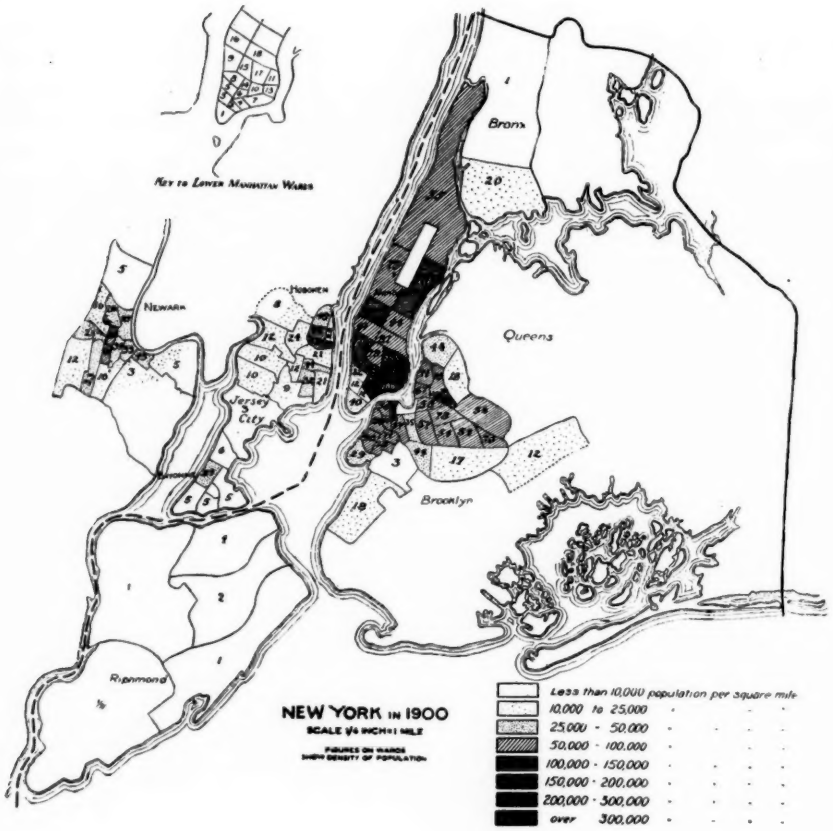
Key to Lower Manhattan Wards
Bronx
Queens
Brooklyn
Richmond
Newark
Hoboken
Jersey City
NEW YORK IN 1900
SCALE 1/6 INCH=1 MILE
FIGURES ON WARDS SHOW DENSITY OF POPULATION
Less than 10,000 population per square mile
10,000 to 25,000
25,000 - 50,000
50,000 - 100,000
100,000 - 150,000
150,000 - 200,000
200,000 - 300,000
over 300,000

TABLE VIII

	OFFICIAL		ANTHOPOGRAPHIC	
	AREA SQ. MILES	POPULATION	AREA	POPULATION
New York.....	307.70	3,473,202	50	3,150,000
Jersey City.....	18.25	219,462	11	198,000
Hoboken	1.22	59,364	1.22	59,000
Newark	15.50	246,070	10	229,000
	342.67	3,962,098	72.22	3,636,000

From census estimates in 1906 it appears likely that this anthropographic city is growing 120,000 a year. By 1909 it would have come to be a city of nearly 4,750,000. Wards 10, 13, and 11 in the lower city, have respectively 418,200, 383,500 and 323,700 people to the square mile, the greatest density known in the world. "The people are largely Russian Jews, living at times 300 to a building in old, three to seven-story houses, though there are some new six-story flats with very small rooms where five families live on a floor. It is a sight worth seeing to watch the people in the street on a good day, absolutely filling it. One must walk in the middle of the street to avoid the children. A large part of these people are tailors and desperately enterprising. Ward 13 was lately Irish and American, but the Jews are driving them out.[1]

The business center, toward the southern tip of the island, is easily made out by its greatly lessened density of population, falling almost below "city" grade in wards 2 and 3, at 12,000 to the mile. Here are the famous skyscrapers, office and newspaper buildings, which extend northeastward along Broadway. There are few dwellings in this part of the city, most of the old buildings being used for wholesale or commission business, warehouses or factories. The shape of the island affords little opportunity for a surrounding ring of denser population. The Americans have in great part moved to Brooklyn, with the multiplication of Jews and Italians.—From *The Anthropography of Some Great Cities, Bull. of Am. Geog. Soc.*, September, 1909.

SAND-BLASTING IN THE COLORADO DESERT.—Sand-blasting in arid regions is a well-known geological process. Sometimes this interesting action of wind-blown sand becomes of immediate economic importance to man. Thus, in the Colorado Desert, the telegraph poles of the Southern Pacific Railway are worn away near the ground, and have to be protected

[1] Communicated by Dr. Ellsworth Huntington, as reported by a New York police sergeant.

by posts or piles of rock. The more resistant knots or rings of growth are brought into relief by the etching of the softer parts of the wood. The fishplates and bolts of the railway tracks are eroded rapidly, and tin cans strewn along the tracks are kept bright and polished by the driving sand, and are quickly etched through, as by acid, and worn away. In *Water Supply Paper* No. 225, of the United States Geological Survey, from which the foregoing facts are taken, there is a picture of a telegraph pole near Palm Springs Station, which shows the deep cutting by the wind-blown sand, and the pile of rocks put up to save the pole from being cut through. —R. DeC. W. From *Bull. Am. Geog. Soc.*, September, 1909.

THE FISHING INDUSTRY OF NEWFOUNDLAND.—A curious little study in interrelations is furnished by a recent despatch from Newfoundland. During the fiscal year which ended in June last, the fishing industry of Newfoundland, and especially the cod industry, was in a very depressed state. Prices were very low, and considerable distress exists. As the colony practically depends upon the fisheries, which yield about seventy per cent. of the exports, the fall in prices has led to general depression all round. The situation has not lightened since the beginning of the new financial year in July, and though it will be impossible to obtain new figures until the present summer, it is not likely that the current year will show any improvement on the last. A factor which is increasing the present depression—and this is the interesting point—is the recent earthquake in Sicily and Calabria. During the last four years there has been a steady increase in the export of fish from Newfoundland to Italy, the last available figures (for 1906-1907), giving a total of £226,200. The provinces of Calabria and Sicily took a very large proportion of this total, and it is feared in Newfoundland that the earthquake, with the resultant depression, will greatly reduce the demand here, and thus increase the seriousness of the outlook in Newfoundland.—From *Scottish Geographical Magazine*, July, 1909.

THE CAMPHOR INDUSTRY IN FORMOSA.—The occupation of Formosa has given to Japan a virtual monoply in the production of camphor. Outside this island camphor is only exploited in certain of the southern islands of the Japanese archipelago, for elsewhere the trees either exist in too small amount to be worth exploitation, or the industry has not yet been started.

The trees formerly occurred over the whole surface of the island, but the wasteful methods employed by the natives have led to their rapid destruction, so that the camphor tree is now only found in the mountainous regions inhabited by still savage tribes. There are no forests composed

exclusively of these trees, which are found scattered through the forests. While trees of small size are numerous, those of sufficiently large caliber for the needs of the industry are rare, and even in the most productive regions are separated from one another by distances of at least four hundred to six hundred meters. In Formosa the trees reach frequently a considerable height and diameter; those in which the basal circumference is from eight to twelve or even thirteen meters are not uncommon. Such trees would supply a camphor still for several years, and would give a yield of camphor of the value of some 400. These trees are, however, somewhat rare, and the majority of the trees utilized have only a diameter of four meters and yield about fifty piculs of crystallized camphor (a picul is equivalent to one hundred and thirty-three English pounds).

The chief difficulty in regard to the exploitation of the trees is that they grow in regions where the workmen are exposed both to savage tribes and to very unhealthy conditions. Before proceeding to set up the still it has been for long the custom to obtain an authorization from the chief of the tribes in whose territories the trees are found, the manufacturer giving an equivalent in the shape of pork, rice and alcohol for the protection afforded. The manufacturers have always been Chinese or Japanese, and begin by clearing in the wood a space on which the primitive still is set up. The apparatus is necessarily rough, because it has to be moved to a new locality as soon as one part of the forest shows signs of exhaustion. In general each still requires only one man to bring the charge and supervise the process of distillation, which is carried on by driving a current of steam through a cone filled with shavings of the camphor tree. The trees are not cut down, but the shavings are removed until the trunk is so weakened that the tree falls to the ground, when the process is continued as it lies. When the trees within a radius of fifteen hundred to two thousand meters of the still are exhausted the apparatus is moved to a new locality.

The camphor tree of Formosa is much richer in the product than that of Japan. As yet the experts at work on the subject in Japan have come to no definite conclusion on the possibility of cultivating the tree, though the approaching exhaustion of the wild trees make some recuperative measure increasingly necessary. An attempt has been made to compel the manufacturers to employ the twigs only, or the leaves, without touching the trunks, but neither method has proved satisfactory. It is feared also that, with the dearness produced by the increasing scarcity of the product, the market may be lost by the substitution of some other substance in the manufacture of explosives and of celluloid. This at the present time is

the chief cause of the demand for the product; the demand in the pharmacy trade, and for religious purposes in British India, being now relatively small. The principal countries with which a trade in the product now exists are, in order of importance, Germany, the United States, England, France, and British India.

The paper gives also a detailed account of the conditions under which the camphor industry has been carried out at various dates. It is now a monopoly of the Japanese Government.

—From *The Scottish Geographical Magazine,* February, 1909.

THE USE OF PICTURES.—When the boy commences scientific geography the picture is of less use to him, as he is concerned now to deal at first hand with the real object. During this stage, modeling, map drawing and geographical excursions, play a considerable part. Pictures are chiefly valuable in the discussion of the geographical excursion, as a reminder of what has been seen and may have been forgotten. As the boy leaves the home district to go further afield in his geographical work, the picture becomes more and more useful. For the realization of a remote region three things are necessary:—(1) a geographical habit of imagination derived from study of some accessible region; (2) a good map of the remote region to be studied; and (3) pictures in series, the approximate effect of which is to show the place as the intelligent traveller sees it.

Many objects of geographical interest, moreover, can only be known to the "stay-at-home" by means of pictures—the coral reef, for instance, though a coral specimen should also be exhibited. On the economic side of geography, knowledge of products must often be obtained by this means. How many boys or girls have the least idea of what the different rubber trees or creepers of tropical forests are like, or how the natives collect and prepare the rubber for the trade? Pictures of the forest, the different kinds of rubber trees, or the processes of the rubber industry make all the difference, not only to their knowledge of this subject, but to their idea of what knowledge is.

Take another example—the difficulties of communication, as affecting the methods and cost of transport. Here is an exercise for the London boy's imagination, to realize the obstacles to transport in a tropical forest or a mountainous region. What can not the kneeling engine, the cog-wheel rail, be made to mean to him when he gets the real stiffness of the steep slope into his imagination?—From *The Geographical Teacher,* Summer, 1909.